Services in a Converged WAN

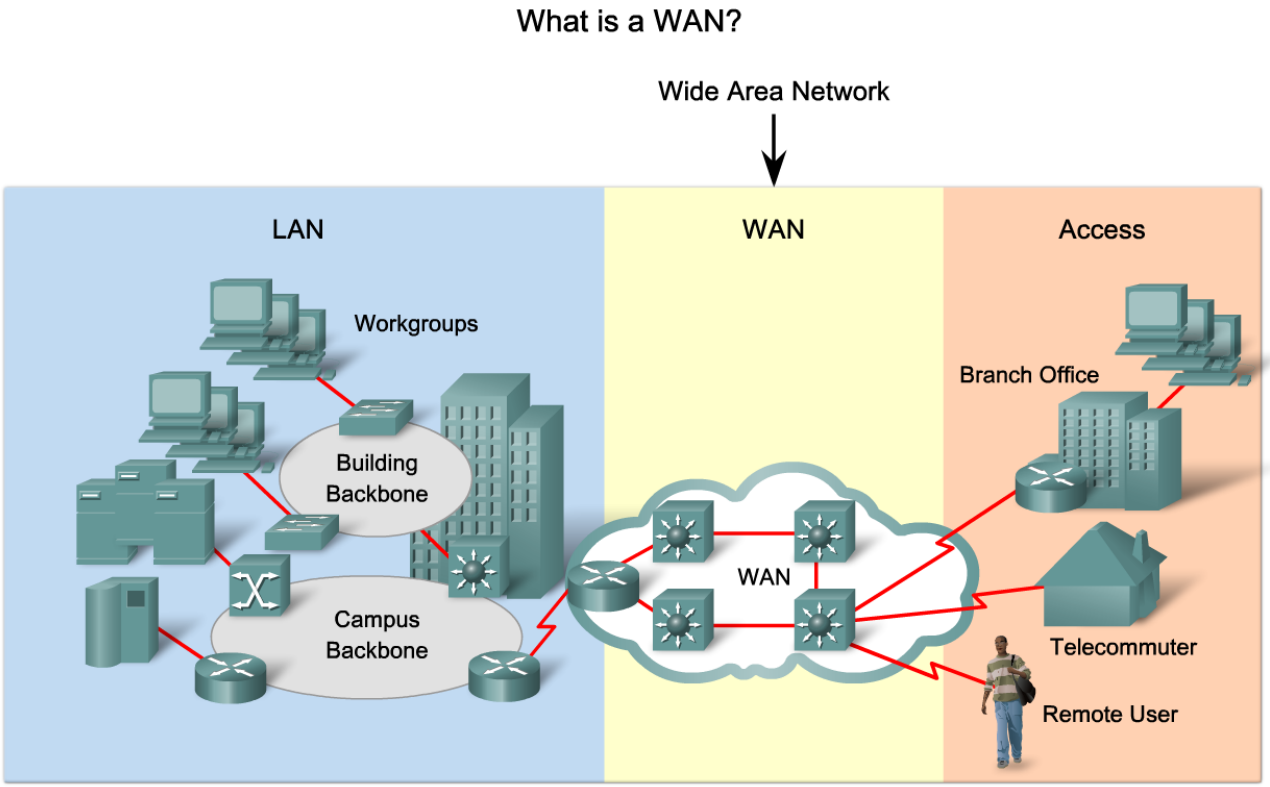
Accessing the WAN – Chapter 1

Objectives

- Describe how the Cisco Enterprise Composite Model (ECNM) provides integrated services over an Enterprise network.
- Describe the key WAN technology concepts.
- Identify the appropriate WAN technologies to use when matching ECNM best practices with typical enterprise requirements for WAN communications.

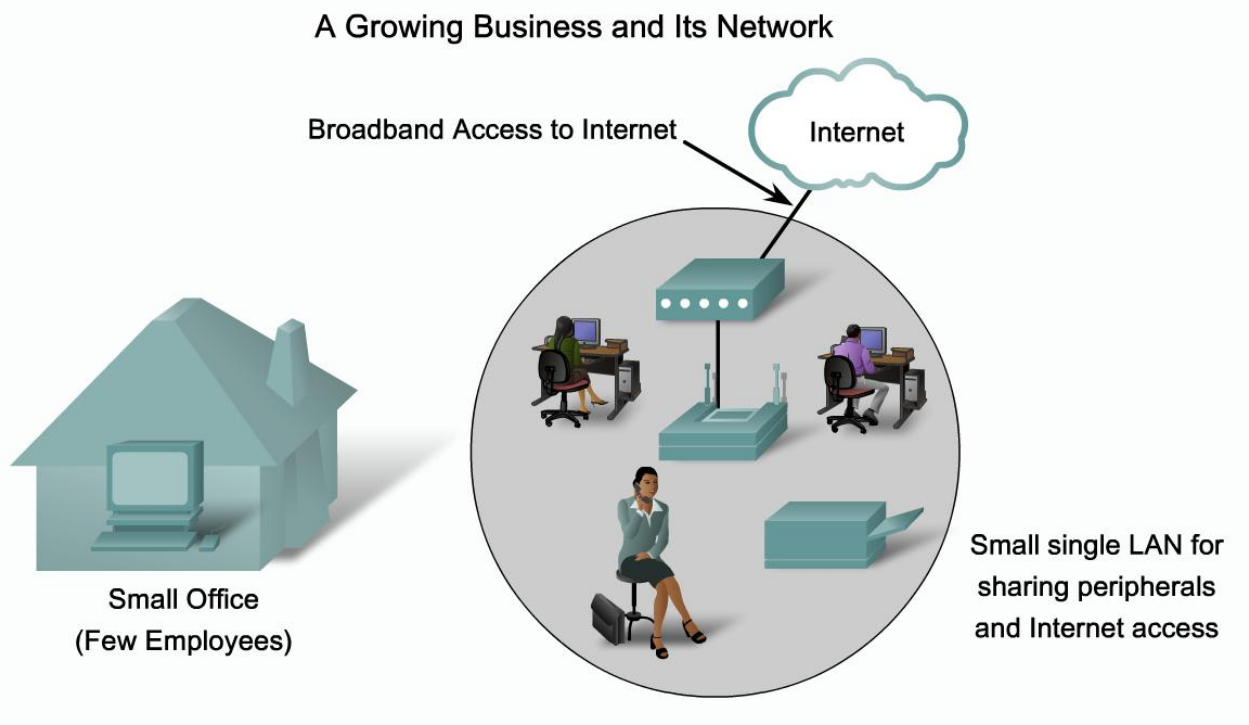
Describe How ECNM Provides Integrated Services over an Enterprise Network

- Explain the purpose and function of WANs



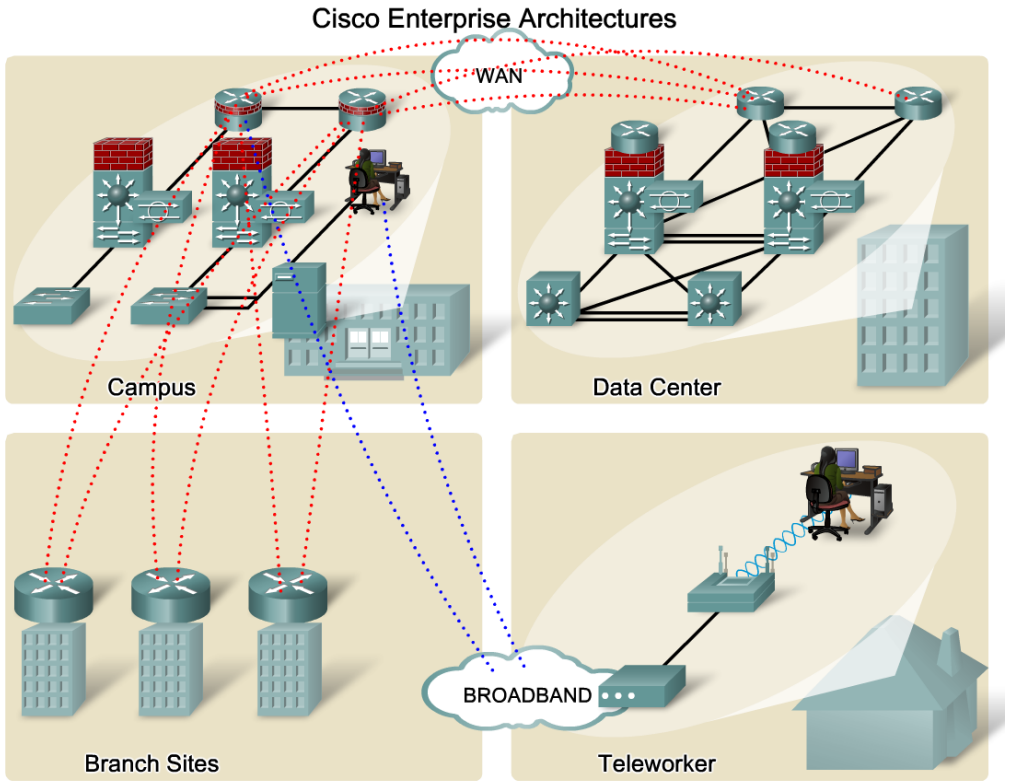
Describe How ECNM Provides Integrated Services over an Enterprise Network

- Describe the stages of business growth, the corresponding business requirements for services and how those requirements are reflected in the Enterprise's changing network topology



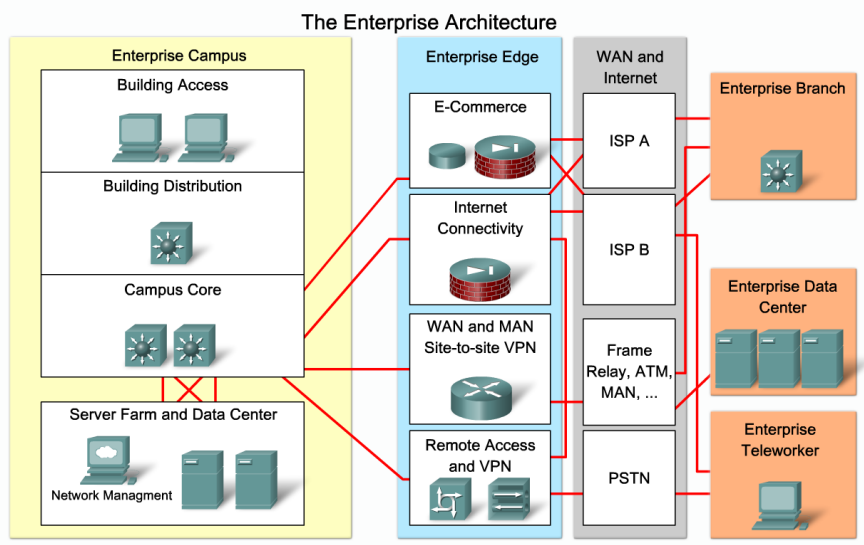
Describe How ECNM Provides Integrated Services over an Enterprise Network

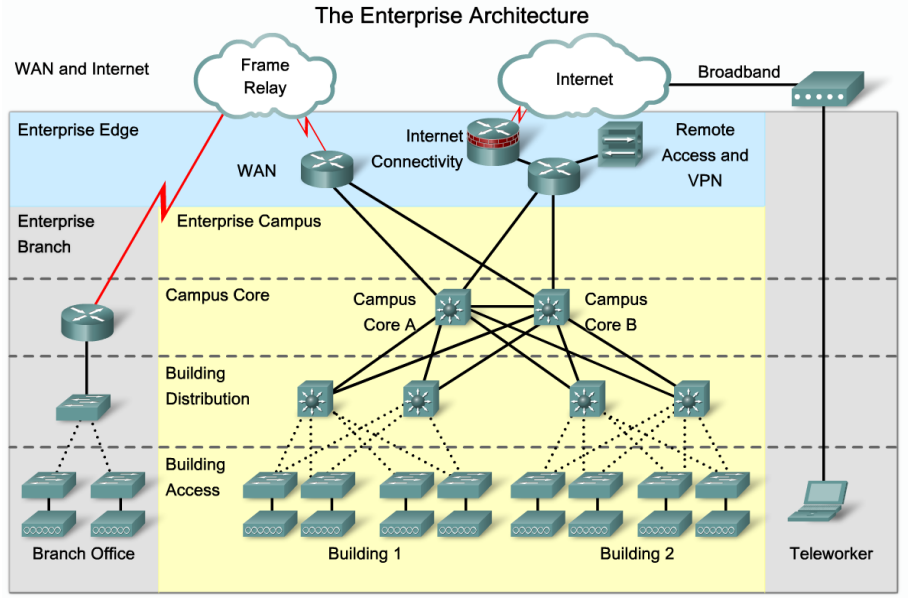
- Describe the problems with the Hierarchical Design Model that Cisco's Enterprise Composite Model has been designed to address



Describe How ECNM Provides Integrated Services over an Enterprise Network

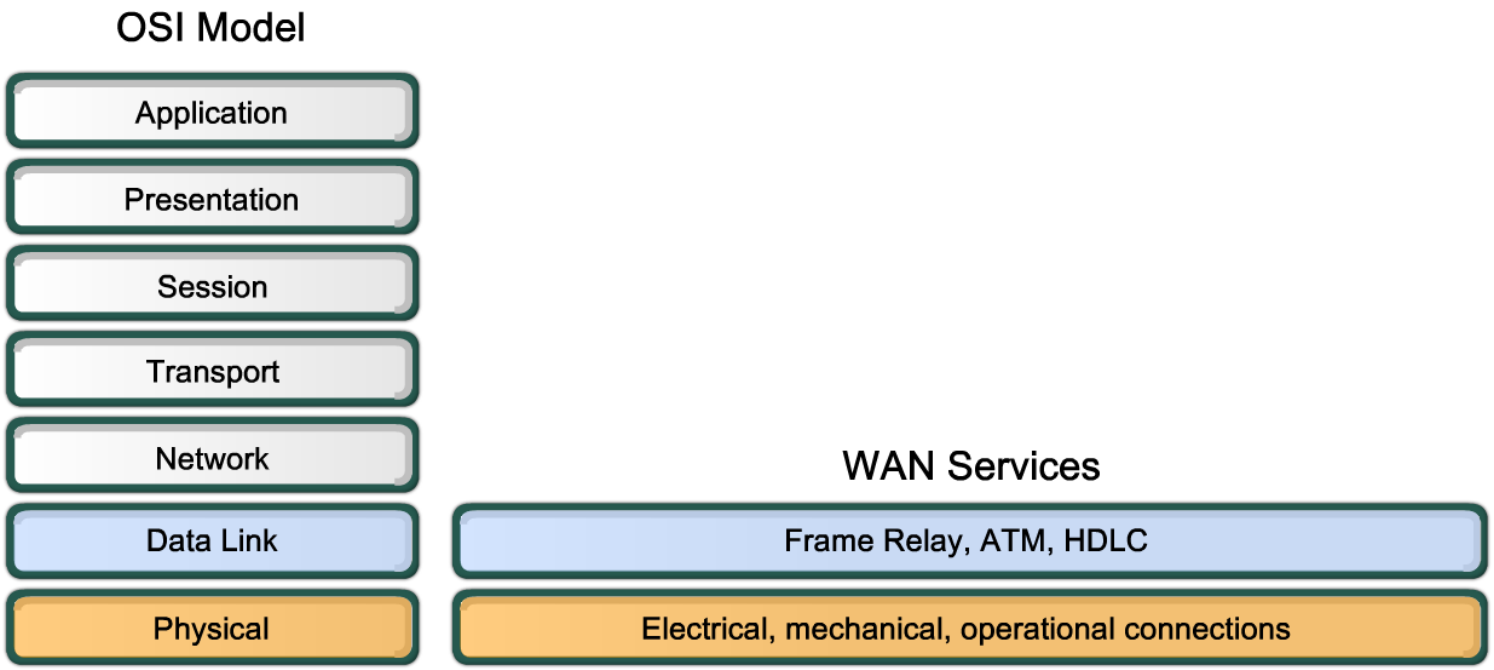
- Explain the purpose of Cisco Enterprise Architectures





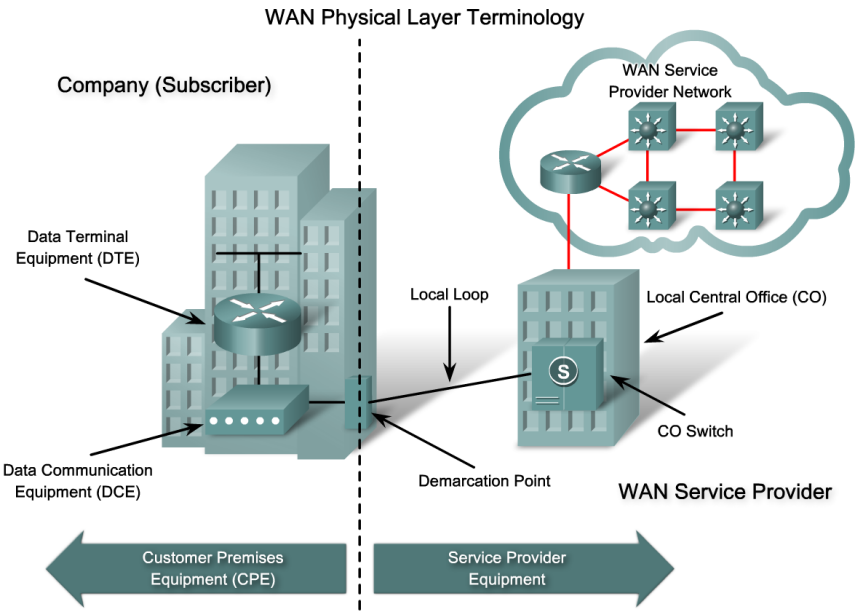
Describe the Key WAN Technology Concepts

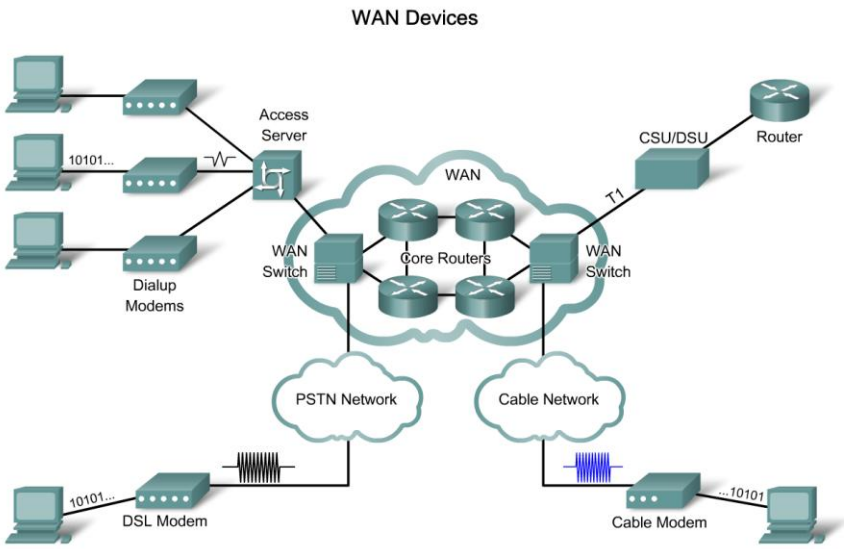
- Describe WAN functions in terms of the OSI Reference Model



Describe the Key WAN Technology Concepts

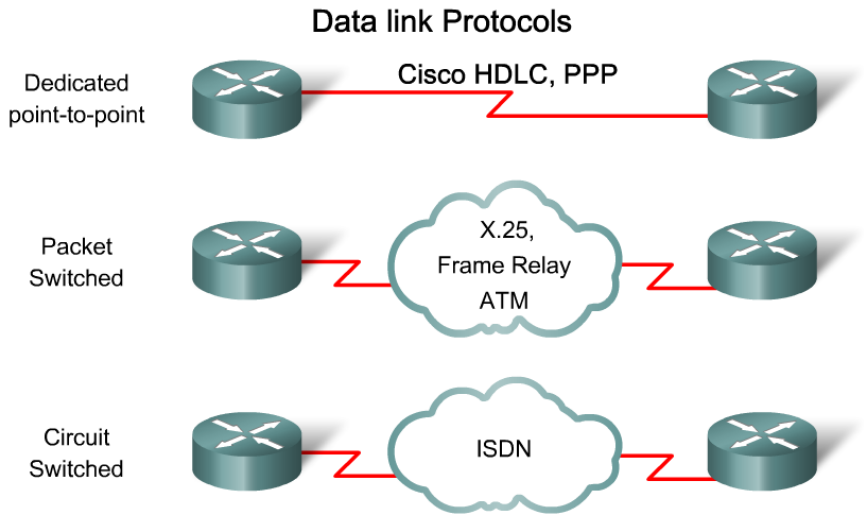
- Describe the key WAN physical layer concepts for network and Internet communications





Describe the Key WAN Technology Concepts

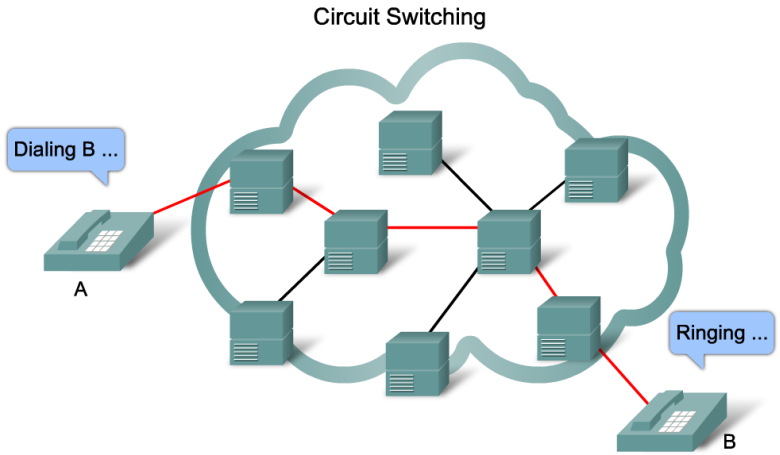
- Describe the key WAN data link layer protocols used in today's Enterprise WAN networks

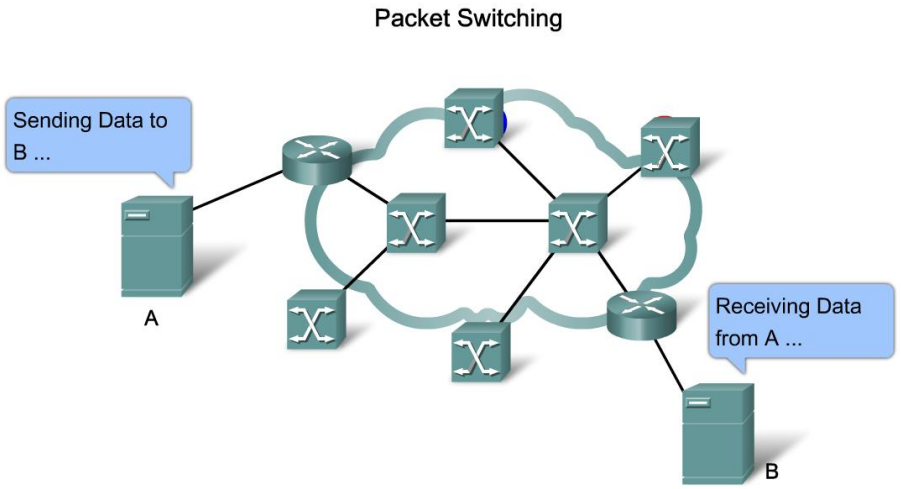


Protocol	Usage
Link Access Procedure Balanced (LAPB)	X.25
Link Access Procedure D Channel (LAPD)	ISDN D channel
Link Access Procedure Frame (LAPF)	Frame Relay
High-Level Data Link Control (HDLC)	Cisco default
Point-to-Point Protocol (PPP)	Serial WAN switched connections

Describe the Key WAN Technology Concepts

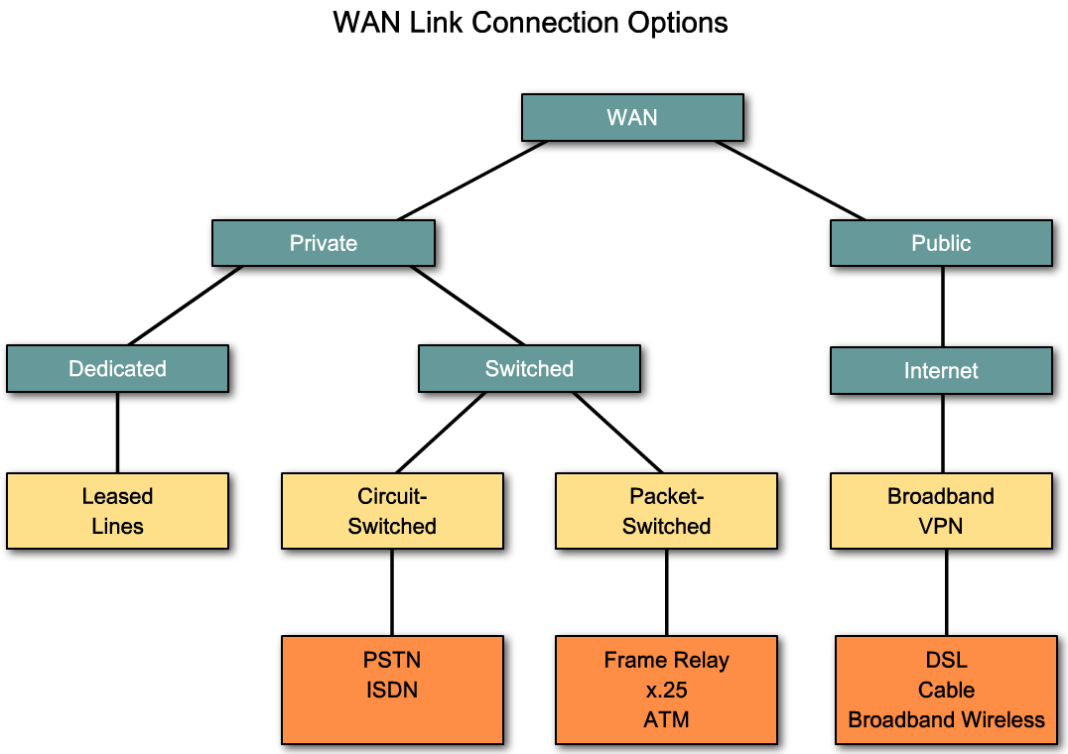
- Describe the switching technologies used for WANs in an Enterprise setting





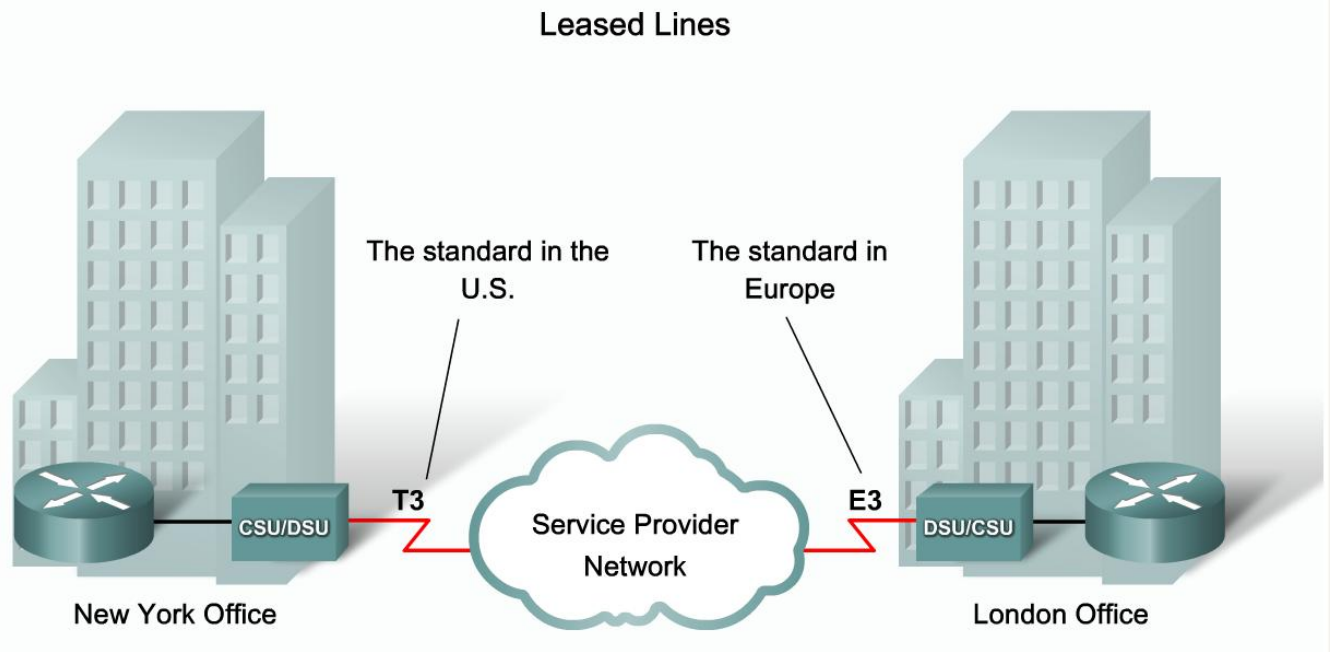
Select the Appropriate WAN Technology to meet ECNM Requirements

- List the various options for connecting subscribers to the WAN



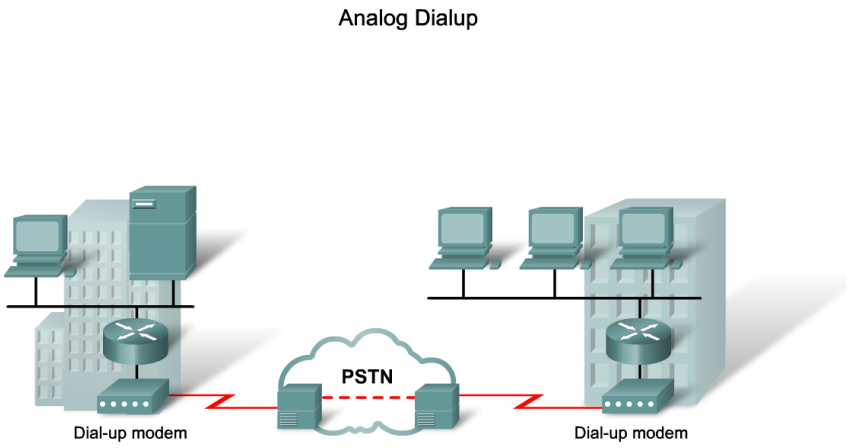
Select the Appropriate WAN Technology to meet ECNM Requirements

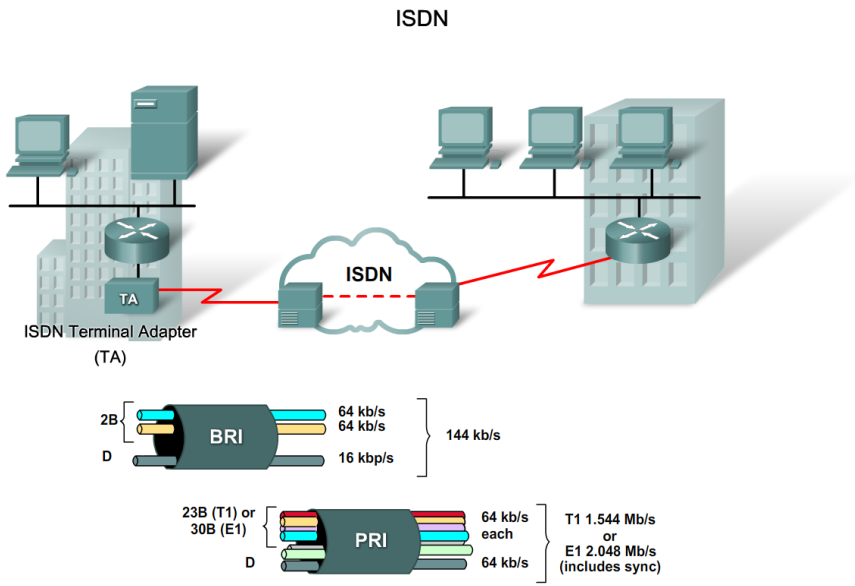
- Describe how Enterprises use leased line services to provide a WAN connection



Select the Appropriate WAN Technology to meet ECNM Requirements

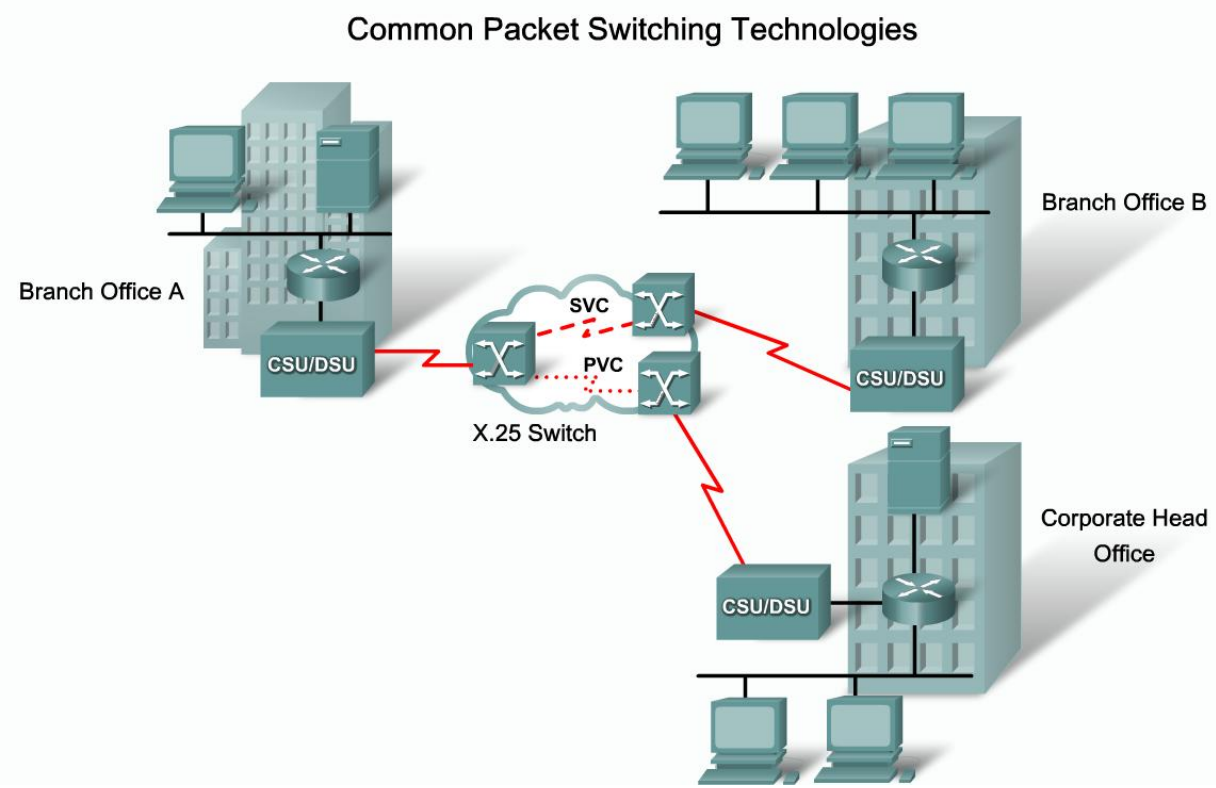
- Describe the circuit switching options available to provide a WAN connection





Select the Appropriate WAN Technology to meet ECNM Requirements

- Describe the packet switching options available to provide a WAN connection



Select the Appropriate WAN Technology to meet ECNM Requirements

- List factors to consider when selecting a WAN connection

Choosing a WAN Link Connection

Option	Description	Advantages	Disadvantages	Sample protocols used
Leased line	Point-to-Point connection between two computers or Local Area Networks (LANs).	Most secure	Expensive	PPP, HDLC, SDLC, HNAS
Circuit switching	A dedicated circuit path is created between endpoints. Best example is dialup connections.	Less expensive	Call setup	PPP, ISDN
Packet switching	Devices transport packets via a shared single point-to-point or point-to-multipoint link across a carrier interwork. Variable length packets are transmitted over permanent virtual circuits (PVCs) or switched virtual circuits.(SVCs)		Shared media across link	X.25, Frame Relay

Summary

- A WAN is defined as

  A data communications network that operates beyond the geographic scope of a LAN

- WAN primarily operate on layer 1 & 2 of the OSI model
- WAN technologies include
  - –Leased line
  - –ISDN
  - –Frame relay
  - –X.25
  - –ATM

Summary

- Cisco Enterprise Architecture
  - –This is an expansion of the hierarchical model that further divides the enterprise network into
    - •Physical areas
    - •Logical areas
    - •Functional areas
- Selecting the appropriate WAN technology requires considering some of the following:
  - –WAN's purpose
  - –Geographic scope of WAN
  - –Traffic requirements
  - –If WAN uses a public or private infrastructure